

COURSE OVERVIEW DE0693
Rock Properties & Rock Mechanics
(E-Learning Module)

Course Title

Rock Properties & Rock Mechanics
 (E-Learning Module)

Course Reference

DE0693

Course Format & Compatibility

SCORM 1.2. Compatible with IE11, MS-Edge, Google Chrome, Windows, Linux, Unix, Android, IOS, iPadOS, macOS, iPhone, iPad & HarmonyOS (Huawei)

Course Duration

30 online contact hours
 (3.0 CEUs/30 PDHs)



Course Description



This E-Learning is designed to provide participants with a detailed and up-to-date overview of rock properties and rock mechanics. It covers the rock mechanics and geomechanical principles; the rock mechanical properties- pressure, stresses, and loads; the geomechanics and borehole stability; the wellbore and in-situ (earth) field measurement; the stress orientation techniques; the elastic, plastic, and viscous models of rock behavior; the fracture mechanics; the reservoir engineering applications; the wireline log predicted mechanical properties data integration; the fundamentals of rock properties including the properties of reservoir rocks; and the porosity, permeability, absolute porosity, effective porosity, conventional view of porosity, primary porosity, sorting, packing and secondary porosity.

During this course, participants will learn the modifications to porosity, dolomitization and shale; the Darcy's equation and permeability values; the typical permeabilities of sedimentary rocks; the permeability measurements, porosity and permeability; the capillary pressure in two fluid system; and the relative permeability, shale gas reservoirs and perform reservoir simulation using a geologic (static) model.



Course Objectives

After completing the course, the employee will:-

- Apply and gain a comprehensive knowledge on rock properties and rock mechanics
- Understand rock mechanics and geomechanical principles
- Understand rock mechanical properties- pressure, stresses, and loads
- Understand geomechanics and borehole stability
- Understand wellbore and in-situ (earth) field measurement
- Understand stress orientation techniques
- Recognize elastic, plastic, and viscous models of rock behavior
- Understand fracture mechanics
- Understand reservoir engineering applications
- Understand wireline log predicted mechanical properties data integration
- Discuss the fundamentals of rock properties including the properties of reservoir rocks
- Describe porosity, permeability, absolute porosity, effective porosity, conventional view of porosity, primary porosity, sorting, packing and secondary porosity
- Apply modifications to porosity and describe dolomitization and shale
- Explain Darcy's equation and determine permeability values including the typical permeabilities of sedimentary rocks
- Carryout permeability measurements and differentiate porosity and permeability
- Determine the capillary pressure in two fluid system
- Identify relative permeability, shale gas reservoirs and perform reservoir simulation using a geologic (static) model

Who Should Attend


This course provides an overview of all significant aspects and considerations of rock properties and rock mechanics for drilling engineers, completion engineers, exploration and development geologists, reservoirs engineers, core and log analysts, geophysicists and oil company research and development staff.

Course Certificate(s)

Internationally recognized certificates will be issued to all participants of the course.

Certificate Accreditations


Certificates are accredited by the following international accreditation organizations: -

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USA International Association for Continuing Education and Training (IACET)

Haward Technology is an Authorized Training Provider by the International Association for Continuing Education and Training (IACET), 2201 Cooperative Way, Suite 600, Herndon, VA 20171, USA. In obtaining this authority, Haward Technology has demonstrated that it complies with the **ANSI/IACET 1-2013 Standard** which is widely recognized as the standard of good practice internationally. As a result of our Authorized Provider membership status, Haward Technology is authorized to offer IACET CEUs for its programs that qualify under the **ANSI/IACET 1-2013 Standard**.

Haward Technology's courses meet the professional certification and continuing education requirements for participants seeking **Continuing Education Units (CEUs)** in accordance with the rules & regulations of the International Association for Continuing Education & Training (IACET). IACET is an international authority that evaluates programs according to strict, research-based criteria and guidelines. The CEU is an internationally accepted uniform unit of measurement in qualified courses of continuing education.

Haward Technology Middle East will award **3.0 CEUs** (Continuing Education Units) or **30 PDHs** (Professional Development Hours) for participants who completed the total tuition hours of this program. One CEU is equivalent to ten Professional Development Hours (PDHs) or ten contact hours of the participation in and completion of Haward Technology programs. A permanent record of a participant's involvement and awarding of CEU will be maintained by Haward Technology. Haward Technology will provide a copy of the participant's CEU and PDH Transcript of Records upon request.

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British Accreditation Council (BAC)

Haward Technology is accredited by the **British Accreditation Council for Independent Further and Higher Education** as an **International Centre**. BAC is the British accrediting body responsible for setting standards within independent further and higher education sector in the UK and overseas. As a BAC-accredited international centre, Haward Technology meets all of the international higher education criteria and standards set by BAC.

Course Fee

As per proposal

Training Methodology

This Trainee-centered course includes the following training methodologies:-

- Talking presentation Slides (ppt with audio)
- Simulation & Animation
- Exercises
- Videos
- Case Studies
- Gamification (learning through games)
- Quizzes, Pre-test & Post-test

Every section/module of the course ends up with a Quiz which must be passed by the trainee in order to move to the next section/module. A Post-test at the end of the course must be passed in order to get the online accredited certificate.

Course Contents

- Fundamentals of Rock Properties
- Properties of Reservoir Rock
- Porosity and Permeability
- Absolute Porosity
- Effective Porosity
- Conventional View of Porosity
- Primary Porosity
- Sorting
- Packing
- Secondary Porosity
- Modifications to Porosity
- Dolomitization
- Shale
- Darcy's Equation
- Permeability Values
- Typical Permeabilities of Sedimentary Rocks
- Permeability Measurements
- Porosity vs. Permeability
- Capillary Pressure – Two Fluid System
- St. Louis Capillary Pressure
- Relative Permeability

- Shale Gas Reservoirs
- Reservoir Simulation
- A Geologic (Static) Model
- Take Home Ideas
- Sediment Compaction and Rock Properties
- Physical parameters of Sedimentary rocks
- Electrical Properties of Rocks
- Archie's Equation
- Resistivity
- Constant Resistivity
- Petroleum Geomechanics in the Value Chain
- Geomechanics Applied to The Petroleum Industry
- What is Reservoir Geomechanics?
- Petroleum Exploration & Production
- Importance of Geomechanics
- Stress and Pressure
- Geomechanics and Oil
- Example: Thermal Contraction
- Geomechanics Applications
- Carbon Dioxide Emissions
- Geomechanics in the Value Chain
- Underbalanced Drilling
- Geomechanics Exploration
- Stresses above a Domal Structure
- Drilling Geomechanics
- Horizontal, Slant Wellbore Stability
- Completions Geomechanics
- Perforation – Damaged Zones
- Hydraulic Fracture, Microseismics
- Reservoir Engineering
- Late-Time Coalbed Permeability
- Reservoir Engineering – Heavy Oil
- Surface Heave from ΔT & Δp